

## Chapter 11. Natural Resources

### Introduction

The City of Shoreview's environmental setting contributes to the quality of life enjoyed by its citizens. Wetlands, open space and lakes comprise about one-third of the City's area, much of which remains due to the City's tradition of protecting its natural resources from development. Current and future residents benefit from these past efforts. Natural resources are part of the City's public wealth and should be managed as any other asset. The City is almost fully developed and the focus of environmental protection measures is to provide long-term preservation and management to these public assets.

The first section of this chapter includes a brief overview of the City's **natural setting**. The following sections describe the existing condition City's natural resources including **wetlands; surface water and shoreland; wildlife and natural communities; native vegetation and woodlands; and air quality**. Each section includes:

- A brief discussion of the **benefits** accrued from the City's natural resources.
- An **inventory** of these resources, if available.
- A description of **existing regulations and programs**.

The next section identifies natural resource management **issues**. The final section includes **goals, policies, and recommended actions**.

### Natural Setting

#### Soils and Geology

The City's geology influences all other natural resources from water to woodlands. The last glacial activity and subsequent erosion primarily shaped Shoreview's soil and topography.

The majority of the City has soils of the Anoka sand plain. This includes the entire area north of Highway 96 and the east half of the City south of Highway 96. The Anoka sand plain is a broad expanse of sands deposited by glacial melt waters.

The portion of the City located southwest of a line roughly between the Highway 96-Lexington Avenue intersection and the City's southeast corner consists mainly of soils of the Twin Cities Formation. Hilly deposits of glacial till dominate the southwestern part of Shoreview. Topography in this area is moderately rolling with occasional steep slopes and depressions. Small lakes, depressions, and drainage ways are scattered throughout the area. Wetlands in this portion of the City are generally the result of a perched water table.

The soils and geology of the City are discussed in greater detail in Chapter 9C – Water Supply.

## **Watersheds**

Shoreview falls within three watersheds as defined by the Minnesota Board of Water and Soil Resources (BWSR). These watersheds are Rice Creek, Grass Lake and Vadnais Lake (**Map 9D-1**).

The Rice Creek Watershed District manages the larger Rice Creek watershed. The Grass Lake watershed lies entirely within the cities of Shoreview and Roseville. The Grass Lake watershed is managed by the Grass Lake Watershed Management Organization (GLWMO), created by a joint powers agreement between the two cities. The day-to-day operational authority for GLWMO functions has been delegated to the Public Works departments of the respective cities. A small portion of the eastern part of Shoreview lies within the Vadnais Lake Water Management Organization (VLAWMO).

## **Existing Conditions**

### **Wetlands**

Wetlands are fully discussed in Chapter 9D – Surface Water. Please refer to that portion of the Comprehensive Plan for a detailed examination of wetland and wetland regulation and the City's goals and policies.

### **Benefits**

The City of Shoreview is fortunate to have an abundance of wetland resources. Wetlands provide a number of important functions in urban communities. Wetlands remove sediments and nutrients from runoff water. Through a combination of filtration and percolation, wetlands are particularly effective at filtering out the fine sediments that most degrade water quality. By providing stormwater storage, wetlands help prevent flooding and related erosion. Wildlife, including migratory waterfowl, use wetlands as habitat. Near lakes, wetlands may serve as breeding grounds for fish. As an “ecotone” or edge environment between land and water, wetlands offer unique opportunities for education and research.

### **Inventory**

A number of wetland studies have been completed within the City of Shoreview. In 1981, a wetland inventory of the City of Shoreview was completed by the Ramsey Soil and Water Conservation District in conjunction with the U.S. Soil Conservation Service. This study identified 82 wetlands within the City, ranging in size from small depressions to large peat areas of many acres. In 1995, the National Wetlands Inventory (NWI) was completed. This federally-sponsored study identified wetlands using the latest method for classifying wetlands. The NWI provides a general location of identified wetlands and a description of each wetland. In 1998,

the City Council commissioned an aerial survey of the city. This survey provided more specific wetland location information than available from the NWI.

Most recently, wetland resources were inventoried in 2004 during preparation of the Second Generation Surface Water Management Plan (SWMP). In addition to locating wetland areas, the SWMP mapped the drainage areas for each surface water feature and modelled important basin characteristics (**Map 9D-5**). This information was used to create the Natural Resources map (see **Map 11-1**).

These data sources provide excellent information on the type and location of wetland resources in the City.

### **Existing Regulations and Programs**

Wetlands are primarily regulated by the Wetland Conservation Act. At the local level, the Rice Creek Watershed District and the Grass Lake Water Management Organization (GLWMO) implement this act. Other agencies involved in wetland management include the Minnesota Board of Soil and Water Resources (BWSR), the Minnesota Department of Natural Resources (DNR) and the U.S. Army Corps of Engineers.

Because other agencies may have limited resources to cover large areas, the City plays an important role in the management and protection of wetland resources. The City is involved in wetland management through its role in the GLWMO; the construction and maintenance of City infrastructure; the development review process; and the management of City-owned lands. Both the Development Ordinance and the Surface Water Management Plan include provisions and standards relevant to wetland management including flood plain management, erosion control, vegetation management, standards for treatment of runoff, and best management practices.

### **Surface Water, Lakes and Shoreland Areas**

#### **Benefits**

The City's lakes are one of the landmark features and the most significant resources in Shoreview. Lakes provide recreational opportunities from swimming to boating to fishing, and water quality is vital to the enjoyment of these activities. Clean water allows water sports without risk to public health and many species of desirable game fish cannot tolerate poor water quality. Location on or near a lake enhances property values, and all property values benefit from the number of public lake accesses available in the City. Lakes have great scenic value both from private and public properties. The City's lakes also serve as habitat for fish, waterfowl, and many other plant and animal species.

## Inventory

The City has 11 lakes and one major stream at least partially within its borders. Lake Owasso straddles the border between Shoreview and Roseville, and Poplar Lake lies on the boundary of Shoreview and White Bear Township. Rice Creek crosses the northwest corner of Shoreview extending to the northeast into Anoka County and to the southwest to the Mississippi River. **Table 11-1** below summarizes available lake data. **Map 11-1**, Natural Resources, shows lakes and shoreland areas.

The Minnesota Pollution Control Agency (MPCA) compiles annual clarity data on many of the City's lakes. Clarity is measured by using a Secchi disk, a metal disk painted in a black and white pattern. The disk is lowered into the water until it disappears from view. The depth at which the disk can no longer be seen is the clarity depth recorded. Where this data has been collected for many years, a statistical analysis can determine a clarity trend. Water clarity is linked to water quality because alga growth and sediment can reduce the depth at which the Secchi disk is visible. **Table 11-1** provides water clarity trend information where available.

**Table 11-1 Lake Data Summary**

<u>Lake Name</u>	<u>Area (acres)</u>	<u>Maximum Depth (feet)</u>	<u>OHW Level (feet)</u>	<u>Clarity (feet)</u>	<u>Clarity Trend</u>
Turtle	409	28	892.4	7.7	No statistical trend.
Owasso	375	37	886.7	4.6	Highly significant declining trend, 1998-2007.
Snail	150	30	883.7	9.9	No statistical trend.
Grass	146	N/A	881.9	N/A	Not available.
Island	60	11	946.7	2.9	Significant declining trend, 1998-2007.
Wabasso	46	66	885.9	9.3	No statistical trend.

**Table 11-1 Lake Data Summary (continued)**

<b><u>Lake Name</u></b>	<b><u>Area (acres)</u></b>	<b><u>Maximum Depth (feet)</u></b>	<b><u>OHW Level (feet)</u></b>	<b><u>Clarity (feet)</u></b>	<b><u>Clarity Trend</u></b>
Martha	34	N/A	898.5	N/A	Not available.
Poplar	19	N/A	N/A	N/A	Not available
Judy	16	N/A	943.9	N/A	Not available.
Emily	12	N/A	919.5	3.0	No statistical trend.
Shoreview	11	N/A	N/A	N/A	Not available.

Source: Minnesota Department of Natural Resources Lake Survey Database. Clarity trend data from Minnesota Pollution Control Agency Lake Water Quality Trend Data, 2007.

The Minnesota DNR also monitors invasive aquatic weeds in the City's lakes. All five Shoreview lakes with public boat access have all been identified as containing infestations of Eurasian milfoil. Curly leaf pond weed, another invasive aquatic plant, is also present in several City lakes. Snail Lake is at risk for infestation by zebra mussels because it is supplemented by water from Sucker Lake which was identified as containing the invasives in late 2007.

Wetlands are discussed in detail in Chapter 9D, Surface Water, and wetland areas within the municipal boundaries have been classified by type (**Map 9D-4**).

### **Existing Regulations and Programs**

**Ordinances.** The Minnesota DNR regulates all activities such as vegetation removal, filling, or dredging below the OHW level of protected waters. Shoreland is defined as the area within 1,000 feet of the Ordinary High Water (OHW) level of a lake or within 300 feet of a stream or floodplain, and the City has adopted a Shoreland Management Ordinance to regulate activities in those areas.

The City has also adopted a floodplain management ordinance to regulate disturbance within the 100-year floodplain. This ordinance seeks to protect life, property, and environmental quality through restricting and managing uses within the floodplain.

The City has a number of other ordinances related to water quality including erosion control requirements and vegetation management.

**Surface Water Management Plan.** In 2005, the City adopted the Second Generation Surface Water Management Plan (SWMP) to manage and protect surface water quality (see Chapter 9D). The SWMP provides goals, policies and implementation actions to protect and improve surface waters in the City.

**Invasive Species.** The Minnesota DNR maintains signage and waste receptacles at the City lakes infested with Eurasian milfoil. Education material on invasive species is available from the DNR and the University extension. In 2005, the City adopted a policy to participate with lakeshore homeowners associations (HOA) that develop lake management plans and work to control invasive aquatic plants, such as Eurasian watermilfoil. The HOAs for Turtle and Owasso lakes conduct annual surveys of the lakes to identify invasive species, and develop treatment plans as needed.

**Goose Management.** Suburban development provides attractive habitat for Canada geese. Resident geese populations have rapidly increased to the point that geese droppings are negatively impacting land use and water quality in some areas. The City participates in the Twin Cities Metropolitan Area goose capture and removal program run by the Canada Goose Program, a private firm with ties to the University of Minnesota. The program attempts to control and reduce nuisance geese populations, not to eradicate geese from a wetland or lake. See the Wildlife and Natural Community section for additional discussion of goose management.

**Operations and Maintenance.** The City's Public Works Department completes normal operation and maintenance activities that help prevent surface water quality degradation. These activities include street sweeping, particularly in the spring, regular holding pond maintenance, and stormwater system maintenance. Necessary stormwater improvements are regularly programmed as part of the City's Capital Improvement Project (CIP) process. See Chapter 9D, Surface Water Management for a more detailed discussion of stormwater management.

## **Wildlife and Natural Communities**

### **Benefits**

Given the lakes, wetlands and open space in the City and surrounding area, it is no surprise that Shoreview is home to a variety of wildlife including a number of rare species and natural communities. These species add to our biological wealth and diversity. Viewing wildlife and identifying plants provide recreational opportunities and enjoyment to many City residents. Wildlife and natural communities have significant value for education and research.

### **Inventory**

Formal inventories have not been completed for most species within the City. The Minnesota DNR maintains records of sightings of rare species. The Ramsey County Biological Survey identifies significant natural communities in the county. **Table 11-2** summarizes rare species and natural communities identified in Shoreview. **Map 11-1**, Natural Resources, shows species and community locations.

**Table 11-2 Rare Species and Natural Communities**

<u>Common Species Name</u>	<u>Status*</u>	<u>Approximate Location</u>
<i>Plants</i>		
Autumn Fimbristylis	Special Concern	Snail Lake Regional Park
Club-Spur Orchid	Special Concern	Snail Lake Regional Park
Grass-Like Arrowhead	None	Snail Lake Regional Park
Tooth Cup	Threatened	Snail Lake Regional Park
<i>Animals</i>		
Blanding's Turtle	Threatened	Numerous; see Map 11-1.
Upland Sandpiper	None	Northwest near Rice Creek.
Red-Shouldered Hawk	Special Concern	Snail Lake Regional Park
River Otter	None	Rice Creek
<i>Natural Communities</i>		
Cattail Marsh	Not Applicable	Grass Lake
Hardwood Swamp	Not Applicable	Grass Lake
Inland Sand Lake Beach	Not Applicable	Snail Lake

Source: Minnesota Department of Natural Resources, Minnesota Natural Heritage Database

\* All statuses shown refer to the state listing. There are currently no federally-listed species in Shoreview.

## Existing Regulations and Programs

**County, State and Federal Programs.** State and federal laws govern protection of rare species. Management responsibility lies with the DNR at the state level and with the U.S. Fish and Wildlife Service at the federal level. Ramsey County includes protection of rare species and natural communities as one element in its management of county parks and open space. The City has no direct role in the preservation of rare species and natural communities but supports federal, state, and county efforts.

**Goose Management.** The City participates in the Twin Cities Metropolitan Area goose capture and removal program run by the Canada Goose Program. Nesting sites throughout the City are surveyed, and trapping occurs at sites where the population appears to have a negative affect on the land or aquatic environment. In 2007, 21 mature Canada geese and 52 goslings were captured at Island, Turtle, and Owasso Lakes. Mature geese are killed, processed and the meat donated to local food shelves. Goslings are used by the Wildlife Science Center.

**Deer Management.** Ramsey County Parks Department conducts annual aerial deer surveys and operates special permit archery hunts in County parks when the number of deer exceeds the capacity of the park. In fall 2007, 22 deer were harvested from Regional Parks in Shoreview. In February 2008, there were 157 deer counted during the 2-day aerial survey of the City, and this is an increase of about 25% since the 2006 winter deer count.

**Feeding Wild Animals.** There are significant populations of deer and wild turkeys in the City, often congregating in areas near open space or undeveloped areas of the City. While the wild animals provide viewing opportunity and enjoyment, they can also damage landscaping, gardens, and affect public safety when they cross roads. The City adopted regulations in 2005 prohibiting intentional feeding of wild animals to discourage incursions into residential neighborhoods.

## **Native Vegetation and Woodlands**

### **Benefits**

Native vegetation and wooded areas provide many benefits and contribute to the quality of life in the City. Mature trees increase property values, while trees planted in public spaces represent investments that appreciate, rather than depreciate, over time. Properly located trees can reduce heating and cooling costs, control glare, and lessen noise and sound. Trees and vegetation help control erosion by intercepting rainfall and reducing the impact of precipitation on the ground while stabilizing soil with their root systems. Trees and native vegetation can also provide food, wildlife habitat, and educational opportunities. Native vegetation can serve as attractive, hardy landscaping that requires less maintenance and watering than introduced species and few, if any, applications of fertilizer or pesticides.

The City recognizes the benefits of native plants, which generally are deeper rooted, and so require less watering than other types of ground cover used in residential setting. Replacing turf grasses with native plants aids in the infiltration of stormwater and reduces demand on the municipal water supply. Yards adjacent to wetlands and lakes also provide a buffer that can reduce the nutrient load on surface water, and so having a positive affect on the water.

### **Inventory**

No City-wide inventory of trees and woodlands exists. The Minnesota DNR maintains lists of rare plants and natural communities and their known locations (see Wildlife and Natural Communities section). Private parcels are surveyed on a project-by-project basis during the City's review process. The Ramsey County Parks and Open Space System Plan includes some information on trees and native vegetation on county land within Shoreview.

### **Existing Regulations and Programs**

The City's vegetation management ordinance includes provisions for tree preservation and establishes replacement requirements for trees removed during development or construction.

Special protection is given to “landmark”, (mature) trees. Landmark trees are defined according to diameter for a particular species.

The City offers technical assistance to citizens on tree planting, maintenance, and care. The City also sponsors a tree disease management program, which seeks to identify and contain diseases such as oak wilt and Dutch elm disease. The City annually budgets to replace diseased, dying, or damaged trees on public property, including boulevards, parks, and open spaces. In addition, the City plants trees, shrubs and annual plants as part of street renewal and other infrastructure projects.

The City participates in the Blue Thumb program that is sponsored by the Rice Creek Watershed District. The City also encourages residents to utilize technical services offered by the Ramsey County Conservation District for native planting, rain gardens and shoreland restoration projects.

## **Air Quality**

### **Benefits**

Clean air is a basic need for human health. Polluted air has been linked to health problems such as asthma and pneumonia, particularly in children and the elderly. Air-borne particles and pollutants can travel long distances and be deposited on land and water thousands of miles away. Air pollutants can also have a detrimental effect on the built environment through acid rain and other corrosive processes.

### **Inventory**

The MPCA operates a network of more than 40 sites around the state to monitor various air pollutants. The MPCA network includes monitoring sites in nearby municipalities, including St. Paul, Blaine, and Fridley. Specific air quality studies have not been done for Shoreview.

The MPCA compiles an annual report called an emission inventory. All facilities in Minnesota that have an air emissions permit, including some in Shoreview, are required to submit an annual emission inventory report to the MPCA. Some facilities are also required to report their emissions of toxic air pollutants annually for the Toxics Release Inventory.

### **Existing Regulations and Programs**

Air quality is regulated by the federal Clean Air Act and by specific state statutes. The Clean Air Act was originally adopted in 1970 and amended in 1990. In Minnesota, enforcement of all state statutes and most federal laws relating to air pollution is the responsibility of the MPCA. The MPCA helps protect the quality of the air by developing and enforcing regulations, providing education, and giving technical assistance.

## Issues

### Water Quality

Water quality is affected by a variety of activities that occur on the land. These activities include development of land, the alteration of wetlands and drainage ways, agriculture, turf management and waste management. Maintaining and improving the quality of both surface and groundwater is vital to the community's economy and quality of life. Water quality issues currently facing the community include land use regulations, lawn care, direct stormwater discharge and illegal dumping.

**Land Use Regulations.** Currently, the City's zoning ordinance does not require a minimum setback for structures or parking areas from identified wetlands. Structures or parking areas can be constructed directly adjacent to the edge of the wetland. Runoff from roofs and parking areas can be detrimental to the long-term health of the wetland. In addition, when a residential structure is close to a wetland, property owners may covertly alter or fill wetland areas to create a larger usable yard. Wetland buffers are encouraged, and sites that have been developed since adoption of the SWMP have included a 16.5 foot buffer around wetlands.

The 1998 Water Quality Initiative identified a number of specific action items geared towards improving water quality. One general recommendation of this report was to re-evaluate current impervious surface standards. Impervious surface ratios, even as little as 20 percent, have been shown to have a direct impact on water quality. The report suggested linking allowed impervious surface coverage to stormwater improvements. The Development Code was amended in 2003 reducing the maximum impervious areas allowed and encouraging the use of best management practices (BMPs) when sites are developed or redeveloped. The use of BMPs is also included in the Development Guidelines of the SWMP.

**Lawn Care.** Landscaping adjacent to wetlands and lakes can also have an impact on water quality. If a manicured lawn is maintained right up to the wetland boundary, runoff containing fertilizer can overwhelm the wetland's capacity for processing nutrients. Along lakeshores, many private property owners have extensively modified the natural vegetation and/or slopes to create a lawn area. The lack of a natural vegetative buffer increases runoff, sediment and nutrient transport to the lake contributing to algae blooms and other water quality problems. Lack of native vegetation can encourage resident Canada geese and can lead to water quality degradation.

Insecticides and other chemicals used for lawn maintenance can also harm habitat. Recent research has identified that long-term exposure to concentrated pesticides is dangerous to human health, especially children. In response, many communities have adopted ordinances limiting the use of pesticides on public property, particularly in parks and turf areas where children play. Pesticides applied on lawns and turf areas can also be carried into lakes, streams, and wetlands and have a negative impact on these ecosystems.

**Direct Stormwater Discharge.** In September 1998, the City completed a Direct Discharge Report, which identified all direct stormwater discharges into the City's lakes. This report identified priorities for providing pre-treatment for these discharges. While managing "non-point" or dispersed nutrient and sediment sources (such as from lawns) is important to achieving water quality goals, eliminating direct stormwater discharges could have an immediate and significant impact on improving and maintaining water quality within the City. However, limited resources for discharge retrofits should be directed where it is most cost effective.

**Illegal Dumping.** Shoreview has a number of large wetland complexes. Portions of these wetlands are relatively isolated, and illegal dumping in these areas can be an issue. Dumping may include trash, litter, tires, yard waste, or waste oil. Illegal dumping may create a public health concern and reduces a wetland's ability to filter sediments, nutrients, and pollutants from incoming runoff. Trash and pollutants can harm wildlife and fisheries.

## **Vegetation**

One of Shoreview's identifiable features is the natural vegetation that is found in the community's open space, residential neighborhoods and along lakeshores. A variety of vegetation types exist including mature woodlands, floodplain forests and marshlands. Development and other land use activities threaten these native plant communities. The City has recognized this threat through its tree and wetland preservation efforts. However, the use of non-native plant materials and invasive species remain issues.

**Native Vegetation.** As Shoreview developed, landscaping including turf and non-native shrub and tree species replaced much of the native vegetation. Loss of native vegetation reduces wildlife habitat, and non-native species may require more maintenance and chemical treatment than native species. Attractive landscaping can be created from native species, particularly in non-turf areas, but developers and landscape architects need encouragement to use these species in new developments or redeveloped areas.

**Invasive Species.** Invasive species are also a concern in Shoreview as they are throughout the Midwest. These species, introduced from abroad, create problems because of their rapid growth, lack of natural predators, and the difficulty in eradicating these species once they become established. Four invasive species of concern include Eurasian watermilfoil, purple loosestrife, zebra mussels, and buckthorn.

- Eurasian watermilfoil is an aquatic plant that can form thick mats that interfere with water recreation and crowd out important native plants. Eurasian milfoil has difficulty becoming established in lakes with healthy native plant populations.
- Purple loosestrife is a wetland plant that invades marshes and shorelines replacing cattails and other wetland plants. Purple loosestrife forms dense stands unsuitable for cover, food, or nesting sites and can dominate habitat formerly occupied by many

endangered plants and animals. Ramsey County has had success controlling purple loosestrife using beetles that feed on the plant.

- Zebra mussels have been identified in nearby lakes and rivers. These small mussels can attach themselves to objects, clog water intakes, smother native mussels, and interfere with food webs of native species.
- Two species of buckthorn, both native to Europe, can invade wetlands, meadows, and moist woodlands. These species include glossy buckthorn and common or European buckthorn. Buckthorn control is labor intensive and usually requires mechanical removal and chemical control.

## **Wildlife Management**

Although the presence of wildlife in the community provides viewing and educational opportunities, it also creates conflict. The urbanization of land within the Metropolitan area has reduced the amount of land available for wildlife habitat. Some species have adapted to these urban conditions or have population levels that can not be supported by available habitat. Issues include the management of goose and deer populations.

**Goose Management.** Canada geese populations on the Mississippi River Flyway have been declining. At the same time, populations of resident (year-round) Canada geese in the Upper Midwest have been growing. These resident geese are lured by the availability of their preferred habitat (short grass near water) created by suburban development. Feeding of geese exacerbates the problem. Geese droppings from resident Canada geese create a nuisance for property owners and have a negative impact on water quality. Wildlife biologists are also concerned that declining Flyway populations could signal an eventual end to the migration of Canada geese.

**Deer Management.** The white-tailed deer population in the Twin Cities has been steadily increasing for the last 20 years. There are a number of municipalities that have populations above acceptable densities and have instituted deer management plans. The City of Shoreview has not had a deer problem to date, but deer removal programs have been initiated at the Twin Cities Army Ammunition Plant (TCAAP) in Arden Hills, in the City of North Oaks, and in Regional Parks. These programs have helped reduce Shoreview's deer herd.

## **Air Quality**

Air Quality is affected by three sources of pollution: mobile sources (vehicles), area sources (gas stations, dry cleaners) and stationary sources (factories, power plants). Weather conditions and topography can also impact air quality, specifically when pollutants are trapped or move from one area to another. Addressing air quality is complex, however, local governments influence air quality through land use and transportation planning. Local government efforts to improve air quality are, therefore, based on land use and transportation decisions that limit congestion, reduce vehicle miles traveled, and provide options to automobile use. For example, higher

residential densities are required to support transit service. Trails and carpooling are alternatives to automobile use that can be promoted through appropriate public infrastructure. See Chapter 4, Land Use, and Chapter 5, Transportation, for additional discussion of land use and transportation issues.

Mobile sources of air pollution, such as vehicle emissions, impact air quality and potentially impact the health of the community. Motor vehicle emissions are partially responsible for increasing levels of nitrogen oxides and increased cancer risk due to inhaling toxic pollutants. This creates health concerns for those residents living near major roadways.

In addition to mobile sources of air pollution, pollution from stationary sources and area sources can be of concern. Area sources are difficult to monitor because the emissions per facility is small but when considered collectively can be of concern. These sources are not only found with commercial or industrial land uses but are present with residential land uses. Examples include outdoor burning, fireplaces and lawnmowers. Pollutants released from stationary and area sources include sulfur dioxide, nitrogen dioxides, carbon monoxide, benzene, mercury, and dioxin.

Wood burning furnaces are not subject to any City regulations, except for the applicable provisions of the Building Code that apply to the installation of these devices. Recreational fires are generally permitted when the fire is less than three-feet in diameter.

Air quality issues with direct health effects include ozone, which is not emitted as a stationary or mobile source. Ozone created by a chemical reaction through the mixing of hydrocarbons and nitrogen oxides and tends to be present on days that are sunny, hot and have calm winds. Ozone is a concern for children, persons with preexisting lung diseases and those working or exercising outdoors.

## **Goals, Policies, and Recommended Actions**

The following goals, policies and actions overlap those contained in other sections of the Plan, including Surface Water, Transportation, Parks, and Land Use.

### **Goals**

1. Manage the City's natural resources so that environmental quality is maintained and enhanced for future generations.
2. Maintain or improve the quality of the water, wetlands, urban forest, and other natural features within the City.
3. Provide for development and redevelopment in a manner that protects the City's natural resources and environment.

4. Reduce air pollution and ensure that land use activities maintain air quality standards.

## **Policies**

- A. Protect wetlands by encouraging landscaping buffers of native, undisturbed vegetation. Consider adoption of regulations for wetland buffers, taking into consideration the wetland classification and purpose, as well as the development potential of the adjacent land areas. Any regulations should address buffer disturbance and mitigation requirements.
- B. Promote native vegetation in the shore impact zone as a means to protect water quality, enhance habitat, and discourage geese nuisances.
- C. Continue to regulate floodplain development in accordance with state requirements and to protect life and property.
- D. Minimize impervious surface coverage where practical and relevant.
- E. Support county, state, and federal efforts to preserve rare plant and animal species and unique natural communities.
- F. Preserve remaining mature trees in the community to the extent possible and ensure appropriate replacement trees are planted where trees are removed.
- G. Consider the impacts on air quality and recognize it's connection to land use and transportation planning.

## **Recommended Actions**

1. Identify methods to promote environmental education within area schools, such as partnerships with educational institutions or non-profit organizations.
2. Continue to support efforts by the Minnesota DNR and the University Extension to control invasive species.

## **Water Quality**

3. Consider revising the City's zoning ordinance to require structure and parking area setbacks from wetlands.
4. Consider revising the City's shoreland management ordinance to recommend and create incentives for natural landscaping in the shore impact zone.
5. Increase education efforts about the wetland benefits, wetland vegetation buffers, and the long-term impacts of illegal dumping, impacts of residential development on surface water

quality, outdoor burning and impact on air quality, in City mailings, newsletter, and other public information outlets.

6. Consider amending the City's zoning ordinance to link allowable impervious surface coverage to storm water management improvements. Investigate alternatives to paving for peak-use parking areas in parks and open spaces. Continue to enforce existing City regulations limiting impervious surface coverage.
7. Continue the City's operation and maintenance activities, such as street sweeping, grit chamber and pond maintenance, which protect water quality.
8. Consider adopting regulations that encourage the use of pervious pavements and hard surfaces that percolate stormwater.

### **Vegetation**

9. Consider developing a long-term plan to replant trees throughout the City, taking care to maintain the age diversity of the urban forest.
10. Consider completing a tree inventory for areas under City management, including streets, parks, and open space, and incorporating this information in the City's Geographic Information System (GIS).

### **Wildlife Management**

11. Continue the City's participation in the goose capture program as resident geese populations warrant.
12. Consider amending the City's landscape ordinance to require or encourage plantings of native species in new development or redevelopment areas.
13. Consider native vegetation demonstration projects on City or County property.

### **Air Quality**

14. Consider local air quality impacts in actions such as making land use decisions and granting permits to businesses.
15. The City will consider acquiring low-emission vehicles and equipment, and installing retrofitting devices on existing vehicles or equipment, as part of its fleet program.
16. Development projects should incorporate buffers, landscaping, erosion control and other design tools to decrease the effects of emissions, dust, dirt and other air contaminants.

17. Reduce motor vehicle trips and vehicle miles traveled through land use planning and transportation planning.